05D Series

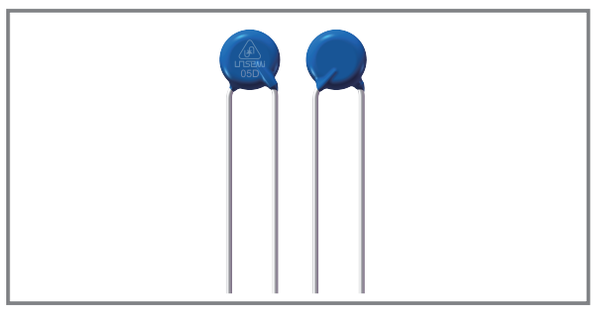
ROHS

Radial Lead Varistor (MOV)

www.unsemi.com.tw

Description

The 05D series radial leaded varistors provides an ideal circuit protection solution for lower DC voltage applications by offering higher surge ratings than ever before available in such small discs. The maximum peak surge current rating can reach up to 0.8KA (8/20 μs pulse) to protect against high peak surges, including indirect lightning strike interference, system switching transients and abnormal fast transients from the power source.



Features

- Wide operating voltages ranging from 11Vrms to 460Vrms(AC)
- Fast response time of less than 25ns, instantly clamping the transient over voltage.
- High surge current handling capability.
- High energy absorption capability.
- Low clamping voltages, providing better surge protection
- Low capacitance values, providing digital switching circuitry protection.
- High insulation resistance, preventing electric arching to the adjacent devices or circuits.

Material

- Coating: Epoxy Resin
- Lead Wire: The Copper Wire
- Electrode: Silver Solder
- Disk: Zinc Oxide

Applicable

- Transistor, Diode, IC, Thyristor or Triac semiconductor protection.
- Surge protection in consumer electronics.
- Surge protection in industrial electronics.
- Surge protection in electronic home appliances, gas and petroleum appliances.
- Relay and electromagnetic valve surge absorption.

General Characteristics Definition

- Operating Temperature: -40℃~ +85℃
- Storage Temperature: -40℃~ +125℃
- Working Surface Temperature: +115℃
- Insulation Resistance: > 100MΩ
- Coating (Epoxy Resin): Flame-Retardant to UL 94V-0
- Approval Standard and File Number:
  VDE: 40046112
  CQC: 16001161414
  CSA&CUL: E489912

Part Numbering

05 - D - XXX - K - X - X - X - X

(1) (2) (3) (4) (5) (6) (7) (8)

(1) Size(mm) : 05mm to 32mm

(2) Type : D: Disk, S: Square

(3) Varistor Voltage :470(47*10^0=47V) , 471(47*10^1=470V)

(4) Tolerance : K±10%, L±15%, M±20%

(5) Surge Current Standard: J:High Surge & High Energy

(6) Taping Mode : TR : Reel

(7) Lead Form : C:Crimped, Short leg : NO : X.X

(8) Coating : H:Epoxy Coating 125℃

Note: (5)、(6)、(7)、(8) options is non-standard

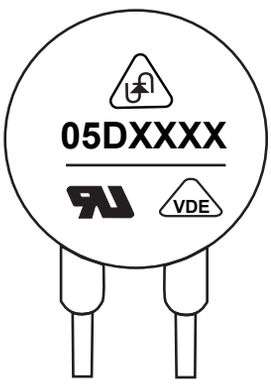
Electrical Characteristics (@ 25℃Unless Otherwise Specified)

Part Number		Maximum Allowable Voltage		Varistor Voltage	Withstanding Surge Current 8/20μS				Max Clamping Voltage		Maximum Energy (10/1000μs)		Rated Power
Standard	High Surge	VAC (V)	VDC (V)	V1mA (V)	I(A) Standard		I(A) High Surge		VC (V)	IP (A)	(J) Standard	(J) High Surge	(W)
					1 time	2 times	1 time	2 times					
05D180L	05D180LJ	11	14	18(15.3-20.7)	100	50	250	125	40	1	0.4	0.6	0.01
05D220K	05D220KJ	14	18	22(19.8-24.2)	100	50	250	125	48	1	0.5	0.7	0.01
05D270K	05D270KJ	17	22	27(24.3-29.7)	100	50	250	125	50	1	0.6	0.9	0.01
05D330K	05D330KJ	20	26	33(29.7-36.3)	100	50	250	125	73	1	0.8	1.1	0.01
05D390K	05D390KJ	25	31	39(35.1-42.9)	100	50	250	125	30	1	0.9	1.2	0.01
05D470K	05D470KJ	30	38	47(42.3-51.7)	100	50	250	125	104	1	1.1	1.5	0.01
05D560K	05D560KJ	35	45	56(50.4-61.6)	100	50	250	125	123	1	1.3	1.8	0.01
05D680K	05D680KJ	40	56	68(61.2-74.8)	100	50	250	125	145	1	1.6	2.2	0.01
05D820K	05D820KJ	50	65	82(73.8-90.2)	400	200	800	600	150	5	2.5	4.0	0.1
05D101K	05D101KJ	60	85	100(90-110)	400	200	800	600	177	5	3.0	4.1	0.1
05D121K	05D121KJ	75	100	120(108-132)	400	200	800	600	210	5	4.0	4.9	0.1
05D151K	05D151KJ	95	125	150(135-165)	400	200	800	600	260	5	4.1	6.5	0.1
05D181K	05D181KJ	115	150	180(162-198)	400	200	800	600	320	5	4.9	7.5	0.1
05D201K	05D201KJ	130	170	200(185-225)	400	200	800	600	340	5	6.5	8.5	0.1
05D221K	05D221KJ	140	180	220(198-242)	400	200	800	600	380	5	7.5	9.0	0.1
05D241K	05D241KJ	150	200	240(216-264)	400	200	800	600	415	5	8.0	10.5	0.1
05D271K	05D271KJ	175	225	270(243-297)	400	200	800	600	475	5	8.5	11.0	0.1
05D301K	05D301KJ	190	250	300(270-330)	400	200	800	600	520	5	9.0	12.0	0.1
05D331K	05D331KJ	210	275	330(297-363)	400	200	800	600	570	5	9.5	13.0	0.1
05D361K	05D361KJ	230	300	360(324-396)	400	200	800	600	620	5	10.0	16.0	0.1
05D391K	05D391KJ	250	320	390(351-429)	400	200	800	600	675	5	12.0	17.0	0.1
05D431K	05D431KJ	275	350	430(387-473)	400	200	800	600	745	5	13.0	20.0	0.1
05D471K	05D471KJ	300	385	470(423-517)	400	200	800	600	810	5	15.0	21.0	0.1
05D511K	05D511KJ	320	415	510(459-561)	400	200	800	600	845	5	16.0	22.5	0.1
05D561K	05D561KJ	350	460	560(504-616)	400	200	800	600	920	5	16.5	24.0	0.1
05D621K	05D621KJ	385	505	620(558-682)	400	200	800	600	1025	5	21.0	25.0	0.1
05D681K	05D681KJ	420	560	680(612-748)	400	200	800	600	1120	5	22.0	29.0	0.1
05D751K	05D751KJ	460	615	750(675-825)	400	200	800	600	1240	5	22.4	32.0	0.1

Approval Standard And File Number

Certified Model No.		c UL us E489912	VDE 40046112	CQC 16001161414
05D180L	05D180LJ	YES	YES	YES
05D220K	05D220KJ	YES	YES	YES
05D270K	05D270KJ	YES	YES	YES
05D330K	05D330KJ	YES	YES	YES
05D390K	05D390KJ	YES	YES	YES
05D470K	05D470KJ	YES	YES	YES
05D560K	05D560KJ	YES	YES	YES
05D680K	05D680KJ	YES	YES	YES
05D820K	05D820KJ	YES	YES	YES
05D101K	05D101KJ	YES	YES	YES
05D121K	05D121KJ	YES	YES	YES
05D151K	05D151KJ	YES	YES	YES
05D181K	05D181KJ	YES	YES	YES
05D201K	05D201KJ	YES	YES	YES
05D221K	05D221KJ	YES	YES	YES
05D241K	05D241KJ	YES	YES	YES
05D271K	05D271KJ	YES	YES	YES
05D301K	05D301KJ	YES	YES	YES
05D331K	05D331KJ	YES	YES	YES
05D361K	05D361KJ	YES	YES	YES
05D391K	05D391KJ	YES	YES	YES
05D431K	05D431KJ	YES	YES	YES
05D471K	05D471KJ	YES	YES	YES
05D511K	05D511KJ	YES		YES
05D561K	05D561KJ	YES		YES
05D621K	05D621KJ	YES		YES
05D681K	05D681KJ	YES		YES
05D751K	05D751KJ			YES

Part Marking



Marking	
Trademark	UN logo
Part No.	05DXXXK/KJ
Standard for Safety	UL / VDE / CQC
———	High Surge
** 05D511K-05D751K No VDE	
** 05D180L-05751K No Csa	

Packaging Information

Unit:Pcs

Dimension	Part No.	Bag	Small Carton	Carton
05D	180L to 751K	1000	10000	20000
05D (Short leg)	180L to 751K	1000	10000	20000

Package Dimensions Unit: mm

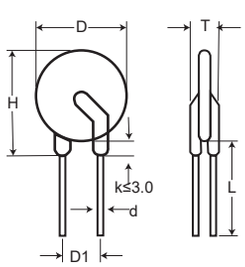


TABLE1	
Symbol	Dimension
H(max.)	10.5
L(min.)	20.0
D(max.)	7.50
D1(±0.8)	5.00
T(max.)	TABLE2
d(±0.05)	0.60

TABLE2			
Model	T(max.)	Model	T(max.)
180L	4.5	221K	4.5
220K	4.6	241K	4.6
270K	4.7	271K	4.9
330K	4.9	301K	5.0
390K	4.8	331K	5.1
470K	4.9	361K	5.2
560K	5.0	391K	5.4
680K	5.2	431K	5.7
820K	4.1	471K	6.0
101K	4.3	511K	6.2
121K	4.5	561K	6.5
151K	4.8	621K	6.5
181K	4.3	681K	6.8
201K	4.4	751K	6.9

Reliability Test (Mechanical Ratings)

Test Parameter	Test Condition / Description	Performance Requirements
Terminal Pull Strength	After gradually applying the load specified below and keeping the unit fixed for ten seconds, the terminal shall be visually examined for any damage Diameter / Loading 0.6mm / 1.0 Kg 0.8mm / 1.0 Kg 1.0mm / 2.0 Kg	No visible damage
Terminal Bending Strength	The unit shall be secured with its terminal kept vertical and the weight specified below be applied in the axial direction. The terminal shall gradually be bent by 90° in one direction, then 90° in the opposite direction, and again back to the original position. The damage of the terminal shall be visually examined. Diameter / Loading 0.6mm / 0.5 Kg 0.8mm / 0.5 Kg 1.0mm / 1.0 Kg	No visible damage
Vibration	The Specimen shall be vibrated by its lead wires with a total amplitude of 1.5mm and a varying frequency of10~55~10HZ(each minutes) for a period of 2 hours respectively in each X,Y and Z directions.	No visible damage △VB/VB%≦±5%
Soldering-solder ability	After dipping the terminal to depth of approximately 3mm from the specimen in a soldering bath of 260℃ for 10±1(D5: 5±1) seconds. Thereafter the terminal shall be visually examined.	Terminations shall be uniformly tinned
Soldering-Resistance to Solder Heat	After preheating the specimen, the specimen shall be completely immersed into a soldering bath having a temperature of 260±5℃ for 10±1 (D5: 5±1) seconds or iron of 400±5℃ for 3±0.5 seconds. There after the change of Vb and mechanical damage shall be examined.	No visible damage △VB/VB%≦±5%

Reliability Test (ENVIRONMENTAL RATINGS)

<table>
<tr><th>Test Parameter</th><th>Test Condition / Description</th><th>Performance Requirements</th></tr>
<tr><td>Dry Heat Loading</td><td>The specimen shall be applied continuously the maximum allowable voltage at the specified conditions for specified period and then stored at room temperature and normal humidity over 2 hours. Thereafter, the change of Vb and mechanical damage shall be examined.Ambient temp：125±2℃ ; Period：1000±24hours</td><td>△VB/VB%≦±10%</td></tr>
<tr><td>High Temperature Storage</td><td>In a drying oven without load.
Ambient temp：125±2℃ ; period：1000±24hours</td><td>△VB/VB%≦±5%</td></tr>
<tr><td>Damp Heat Loading</td><td>The Specimen shall be vibrated by its lead wires with a total amplitude of 1.5mm and a varying frequency of 10~55~10HZ(each minutes) for a period of 2 hours respectively in each X,Y and Z directions.</td><td>△VB/VB%≦±10%</td></tr>
<tr><td>Temperature Cycle</td><td>Condition the specimen to each temperature form step 1 to step 4 in this order for the period shown in the table of specifications. The change of Vb and mechanical damage shall be examined after 2 hours.
<table>
<tr><th>Step</th><th>Temp℃</th><th>Period</th></tr>
<tr><td>1</td><td>40+3℃</td><td>30 min.</td></tr>
<tr><td>2</td><td>Room Temp</td><td>15 min.</td></tr>
<tr><td>3</td><td>85+2℃</td><td>30 min.</td></tr>
<tr><td>4</td><td>Room Temp</td><td>15 min.</td></tr>
</table></td><td>No visible damage
△VB/VB%≦±10%</td></tr>
<tr><td>Surge Lifetime Rating</td><td>The change of Vb shall be measured after the impulse listed below is applied 10,000 times continuously with the interval of ten seconds at room temperature.Vb and mechanical damage shall be examined.</td><td>No visible damage
△VB/VB%≦±10%</td></tr>
<tr><td>Voltage Proof</td><td>Voltage：2500VAC Leakage Current≦0.5mA
Time：60 Seconds</td><td>No Breakdown</td></tr>
</table>

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